

Contemporary Concepts of a City in the Context of Sustainable Development: Perspective of Humanities and Natural Sciences

Współczesne koncepcje miast w kontekście zrównoważonego rozwoju: perspektywa humanistyczno-przyrodnicza

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Abstract

The article's purpose is to present, in the first place, mutual dependences between theoretical and practical speculations concerning urban space, shaped on the base of the sustainable development principle, difficult to implement in practice. Secondly, the text is supposed to serve closer explication and regularization of terminology referring to sustainable urban development. Thirdly, it concerns more precise reflection on the problem of sustainable city, frequently compared to eco-city, green, compact or smart city, as concepts of non-identical from their definition. Fourthly, the text aspires to bridge the gap in editorial market, as far as the wide range of subject literature, is concerned and lack of review studies referring to sustainable urban development.

Key words: sustainable urban development, sustainable development, sustainable city, eco-city, green city

Streszczenie

Artykuł ma na celu ukazać, po pierwsze jakie zależności zachodzą pomiędzy teoretycznymi a praktycznymi rozważaniami na temat przestrzeni miejskiej kształtowanej w oparciu o trudną wdrożeniowo zasadę zrównoważonego rozwoju. Po drugie, tekst służy bliższej eksplikacji i uporządkowaniu terminologii z zakresu zrównoważonego rozwoju miast. Po trzecie, artykuł poświęcony jest bliższej refleksji nad problemem miasta zrównoważonego, konfrontowanego częstokroć z koncepcją eko-miasta, miasta ekologicznego, zielonego, kompaktowego, czy też miasta inteligentnego, jako konceptami z założenia nietożsamymi. Po czwarte wreszcie, tekst pretenduje do miana nieobecnego na rynku wydawniczym, a obszernego z uwagi na zastosowaną literaturę, przedmiotu opracowania przeglądowego z zakresu zrównoważonego rozwoju miast.

Słowa kluczowe: zrównoważony rozwój miast, zrównoważony rozwój, miasto zrównoważone, eko-miasto, miasto zielone

Introduction

Modern city development runs at a rapid pace. In the space of last years we have had to do with transformations of urban space caused by certain processes, like: urbanization, suburbanization, deurbanization, but also reurbanization (van den Berd et al., 1982),

which from the very beginning have been accompanied by industrial-technological development. Another factor, taken into account while estimating the situation of contemporary cities, is globally observed progressive and steadily dynamic growth of cities

population, which in turn generates a variety of problems of both, social-economic and environmental character.

Therefore, a city, due to its exceptional character has become a research subject of theoreticians and practitioners, representing a diversity of knowledge branches. As every complex construct, a city, because of its heterogeneity and complexity, has also become a subject of closer inspection, reflection, interpretation and last but not least – a subject of an attempt of closing it in a definition and redefinition. It should be emphasized, however, that a city in interdisciplinary conceptualization, i.e. humanistic-natural, has been perceived as a living, and in consequence still changing, organism, with a key role, comparing to organ instrument, of particular functional spaces, combined together with a sophisticated informative-communicative network. The emphasis has been put on the fact, that a city – despite, the so called material structures (consisting of architectonic arrangements, networks of streets, plumbing, wiring, energetic and sewer systems) also possesses nonmaterial or spiritual structures, equally important for a city tissue (including people and their multi-territorial activities), regarded by many researchers as priority ones for transforming and developing a *living city*.

The immediate necessity of further strategy and in consequence optimal direction of a city future development appeared together with changes in perceiving a city by philosophy and disciplinary sciences (including natural sciences), where a city is a ductile forming composition, evolving constantly. Aware of catastrophic results of urban development, including progressing demographic and ecological crisis, economic decline, the scientists started to postulate the real emergency of implementing the rules of sustainable development, which should be a remedy for increasing problems of contemporary world, both in global and local scale, including urban space, being within our interests.

Taking all facts listed above into consideration, the article's purpose is to point out interdependencies between theoretical discourses on urban space developing in accordance with the rule of sustainable development and its practical interpretation and application. Moreover, the authors tried to arrange the definition confusion, observed in numerous studies on sustainable city development, what in turn can be related to unrestricted use of non-identical definitions, as it is in case of terms, like: sustainable city, eco-city, ecological city, green city, compact city, smart city, etc. In order to explicate the questions in a more proper way, the authors subjected to analyses current literature on the problem of sustainable urban development and undertook the effort of systematizing the definitions listed above. Selected issues from the sustainable city development questions are also presented.

Philosophy of a city in the context of sustainable development

A city has always been the subject of philosophers interests, whereby the issue was initially considered in two ways, either in the context of social idea or urban-architectural formation. Therefore, in the space of centuries we have been observing shaping urban space in accordance with philosophical principles, predominant in particular epochs. One of the first reports concerning a city character can be found in Aristotle's works, his *Politics* in particular, in which the philosopher postulates to situate a city in the center of the dependent territory, concentrate its inhabitants and create conditions for their activity (Gendźwiłł, 2006). He also suggests to create a city that way to provide its dwellers protection and make them happy (Gutowski, 2006).

During mediaeval period, on the grounds of Christian philosophy, many cities structural arrangements referred with their shape to a cross.

In the Enlightenment times, newly created urban complexes were designed to meet social needs of combining dwelling and work places, what in turn was compatible with predominant rationalist doctrine of that epoch and popular idea of community of dwelling (Paszkowski, 2011). Next philosophical trends had also great impact on newly created architectonic-urban concepts, which in perspective aspired to create an ideal city.

Contemporary various philosophical reflections touch the problem of a city and urbanization, as well, quoting e.g. works of Lopes De Souza (2000), De-Shalit (2003), Fraser (2008, 2009) or Akkerman (2014).

It should be remarked, however, that concepts of a city were frequently of an utopian character, like their extreme and sophisticated examples of Plato, Thomas Morus, Tommaso Campanella and Francis Bacon. Blum defining utopia idea, including the utopia of a city, had a feeling that *society was capable of constant or progressing improvement in a planned manner* (Gutowski, 2006). The definition above is compatible undoubtedly with the concept of a city utopia, although it should be remarked, that there is a difference between an utopian city and an ideal city, often mistaken with it. An ideal city is a separated project, aesthetically-architectural from its assumption (Alberti, 1960; Eaton, 2002; Rosenau, 2006), while an utopian city is subjected to social utopian concepts, and its arrangement is supposed to serve building social order (Kanter, 1968; Velho, 1973; Davis, 1981).

Philosophy of a city is directed at harmonious and permanent mutual infiltrating of two surfaces, i.e., formal and contextual. A city form consists of its spatial structure and infrastructure background, being a material city dimension. Bartnik (1993) defines it as somatic city dimension, expressed in the space, buildings, street etc., while in fact, a city context is

composed of people and their activity, building the so called – subjective city dimension. Following Bartnik, it can be stated that philosophy of a city is the ground of all the disciplinary sciences dealing with a city, although it is unaware sometimes. Urban space creation has always required basing on a certain urban theory on philosophical grounds, though (Paszkowski, 2011). That spirit is the context for speculations on sustainable city development, which apart from practical implications of its implementation, contains in the first place, theoretical conditions, originating from (what should be stressed) philosophy of sustainable development.

It must be added, that the concept of sustainable urban development is a direct consequence of approval and application of the idea of eco-development, claiming, among others, the need of redefining the mutual relation – human-nature, while the concept of sustainable urban development, mentioned above is as range and topics are concerned, much more comprehensive, than the concept of eco-development, because *the question of economic, social, cultural development and the problems of natural environment is treated as integral, interrelated, interdependent and 'interconditioning unity'* (Tyburski, 2013, p. 83). As Hull remarks, the philosophy of sustainable development has its base in four kinds of convictions: 1) *perceiving natural world and human (human community) place in it and relations and interactions with nature*; 2) *accepted understanding of a human and social world created by him*; 3) *approved values and human life purpose and accepted ideas and social visions*; 4) *understanding and evaluation of technique and its role in shaping of the relation: human-nature* (Hull, 2003, p. 17-18).

Specifying sustainable development, the attention is usually turned to its key features, which are depicted in constructs of sustainable urban development, such as e.g. tendency to achieving an order (social, economic, spatial, environmental) during the planning process and development implementation; the necessity of constancy, i.e. accentuating interests of future generations; self-maintenance – which means basing on renewable resources and their substitutes, creating reserves for future development and what is crucial, integral, systemic and holistic thinking (Tyburski, 2013).

Theoretical conditioning of sustainable development appears frequently as a research subject of scientific papers (inter alia: Dołęga, 2005; Gawor, 2006; Pawłowski, 2008, 2011; Papuziński 2005). Eco-philosophy was and still is the philosophical current, taking up vast issue of sustainable urban development, focusing e.g., on theoretical background of shaping a city following the idea of sustainable development, inter alia, Tyburski (2011, 2013), Leźnicki (2011), Sztumski (2013), Leźnicki, Lewandowska (2014a, 2014b).

Concepts of a city in the context of the principles of sustainable development

Human anthropogenic activity has taken its toll particularly intensely in the space of urban centers inhabited by us and constantly redefined, being the direct results of wide-ranged techno-interference of a human into natural space, called *urban landscape* (Leźnicki, Lewandowska, 2014).

Cities cumulate majority of economic activity, including food and energy production, transportation services and intensive land use, what on the one hand contributes to a variety of profits, on the other hand, creates a number of problems and concerns, starting with social-economic problems (i.e. unemployment, social differences, increase of social stratification and social pathologies), ending up with environmental degradation (air and water pollution, excessive noise and waste and the inconveniences of its recycling). Facing these difficulties, every city doubtlessly deals with the task of eliminating or at least diminishing their affects (Lewandowska, 2014a). To conduct the activity in order to improve the inhabitants' life quality, we should direct, as e.g. Mega (1996) remarks, our efforts to obey prevention and forethought rules to protect urban organism in certain circumstances. The reasons listed above require from urban environmental management accordance with rules of sustainable development, which has become at present one of the most crucial and difficult in application issues for the nearest future (Hens, 2010).

As it was remarked before, rich subject literature delivers a number of concepts concerning city development seen in the context of sustainable development (see fig.1). Literature describing the relation human-nature presents one of the first urban concepts which was garden city concept (Howard, 1965; Batchelor, 1969; Buder, 1990; Ward, 2005), which has its contemporary counterpart in the idea of a green city. This one in turn assumes strong bond of architecture with nature, what implies the need of increasing biologically active area. This attitude is to provide the balance between natural environment and a city, which is crucial for stopping the process of biodiversity decline (observed in particular interest of significant *Rio Convention on Biological Diversity*, 1992), and in the estimation made by Brennan, O'Connor (2008), Kirpatrick et al., (2013). Theoretical assumptions of a green city are frequently analogous with practical guidelines for sustainable urban development, what is particularly clear while making city rankings, basing on the so called *green city index* (inter alia, European Green City Index, US and Canada Green City Index).

Ecological city is regarded as mistaking term as it contains contradiction in itself, which can be explained evoking to the term ecology. Ecology in its



Fig. 1. Concepts of a city in reference to the principles of sustainable development, source: the authors' own research

original meaning defines science of the whole range of interactions between flora and fauna in biotic and abiotic environment (Umiński, 1996; Krebs, 2001; Dołęga, 2011). A city is of course a subject lying within the spheres of ecology interests as an integral component of the environment, but not strictly natural environment, rather its social-cultural part, i.e. transformed as a result of human activity. Each human activity influences natural environment, redefining it and giving it new context. The term *ecology* has become fashionable recently, has been equipped with common dimensions becoming colloquial term, what in consequence had an impact on its common misusing, which is also the case of improper meaning of another term – ecological city. In this situation, we can at the utmost speak about, the so called, ecological interpretations of urbanization processes or ecological activity for environmental protection of urban space (Wojtyszyn, 2001). This is what White, among others, wants to say (2012), indicating how to build an ecological city, when his interpretation of the term *ecological* refers solely to urbanized structure and space (i.e. implementation ecological solutions and technologies) and not holistic perceiving natural environment.

Alternating idea, the so-called compact city, referring to assumption of urban space concentration, concerns creating cities of smaller sizes, what in consequence should lead to the landscape protection against greedy activities of developers, minimizing of waste producing and diminishing pollution. It must be added here, that if the concept of compact city is close to concept of sustainable development, it is incompatible with the idea of sustainable development. Bruggess, for instance, observes that: *there are also a number of other economic, social, cultural and political justifications for compact city initiatives and different and often contradictory policies for sustainable urban development* (Bruggess, 2010, p. 9). Compact city concept, taking the above into consideration, does not have to harmonize with the concept of sustainable urban development (Burto et al., 1996; Lin, Yang, 2006; Westerink et al., 2013). The concept of smart city, being currently in common discourse, appeared together with technological

-informative development as a continuation of earlier city concepts connected with scientific-technological progress, being specific transition from scientific city (Ford, 1913; Inhaber, 1974), through edge city (Garreau, 1991; Henderdon, Mitra, 1996), to digital city (Ishida, 2002). Smart city possesses a number of meanings and definitions. It is a digital city perceived as a place inhabited by population implementing dynamic information and communications technologies. Smart city's potential is measured, within the discussed concept, by broadband Internet access, effective education for knowledge-based economy, policy of the Internet popularization, increase of innovativeness level, scientific-technological centers presence or even implementation of activities for absorption of talented employees (Batty et al., 2012). Smart city is also distinguished by three factors' integration, i.e. presence of creative class, collective intelligence of urban population and artificial intelligence in form of digital infrastructure (Komninos, 2002). City perceived that way develops on the grounds of the network-centric organization of the elements, like: knowledge, technologies, human resources, infrastructure diversity and urban environment access (Caragliu et al., 2009; Szymańska, 2013; Szymańska, Korolko, 2015). Smart city is frequently defined as sustainable city, due to implementation of modern environmental friendly technologies and systems of sustainable development.

The term eco-city is frequently identified with the term sustainable city, what in turn could be justified only under condition of using the wide range of the definition referring to implementation of all rules of sustainable development into urban tissue. The concept of eco-city was formed for the first time by Richard Register in 1975 and it assumed in the beginning, among others, the need of *rearranging a city in the balance with nature* by the means of appointing, the so called *slow streets*, growing and picking fruits from roadside trees, appointing bus transport lines, promoting pedestrian and cycling traffic, suspending building local dual clearway (Register, 1987). Therefore, it was eco-city definition in a narrow view. Nowadays, eco-city is often named using in simplification the term of healthy city or arranging a city taking into account ecological requirements, combined with social-economic conditions (Leźnicki, Lewandowska 2014a). This concept assumes, that eco-city is supposed to be a friendly city, innovative, cost-effective, well equipped with adaptable solutions, neutral for natural environment and healthy for its dwellers, what is emphasized by many researchers (Engwicht, 1992; Roseland, 1997; Kline, 2000; Ma, 2009; Yigitcanlar, 2009; Joss, 2010).

However, there are no commonly obligatory definitions, nor the ones which would define univocally contemporary concepts of urban development in accordance with sustainable de-

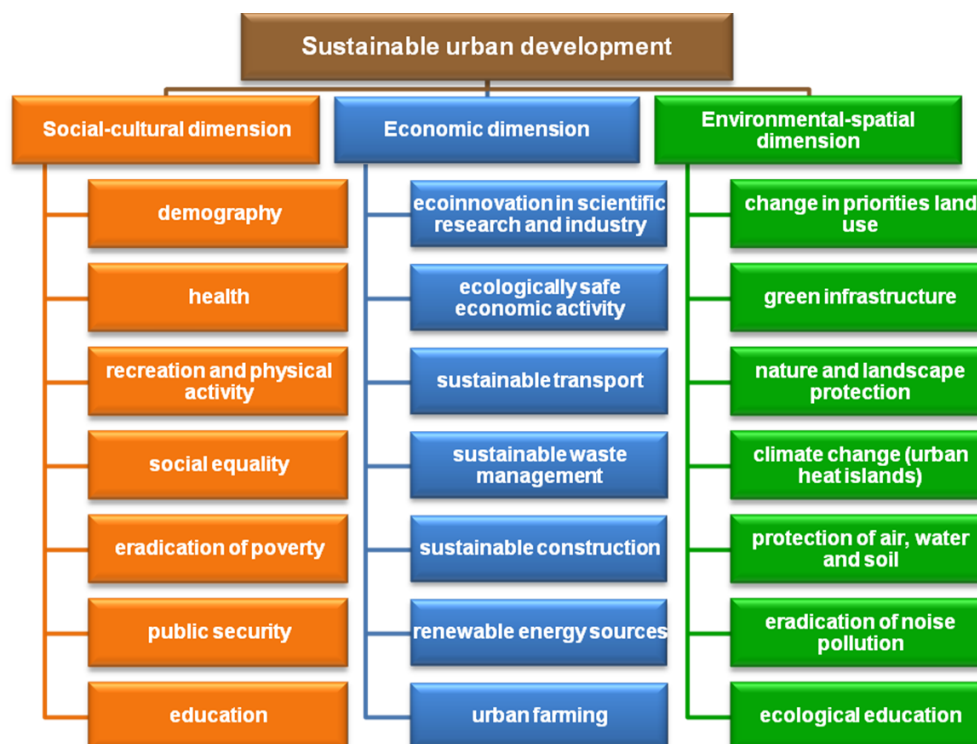


Fig. 2 Dimensions of sustainable city development, source: the authors' own research

development. Scientific literature often uses terms: green city, eco-city or sustainable city, as identical definitions. It is difficult to indicate which of them appeared as the first one, but studying subject literature, a conclusion can be drawn, that the idea occurring the most often is the term *sustainable city*¹. It seems to be the most precise qualification for a city functioning according to sustainable city patterns, as it contains the word *sustainable*, which refers to all three key development aspects, i.e. economic, social and natural. Sustainable urban development means, on the one hand, improvement of life quality of its present inhabitants, but it is also connected with actions tending to address the needs of future generations, not limiting simultaneously regional welfare. Paszkowski adds to the questions above, that: *ideal sustainable city is the structure exploiting the environmental resources to such an extent, to which it can renew it. It is a city of gradual, deliberate and intentional development* (Paszkowski, 2011, p. 196). The literature also delivers many city models referring to sustainable development. We can quote models of self-reliant cities, redesigning cities, externally dependent cities and a model of fair shares cities (Haughton, 1997). All quoted model examples are regarded as equal types of sustainable cities. To be called a sustainable city, it must fulfill a number of baseline criteria, which are generally discussed in subsequent part of the text.

¹ The authors estimate, taking into account the Internet data base of scientific publications, that by the year 2014

Dimensions of sustainable city development

Making a general review of subject literature, apart from a variety of scientific disciplines subjecting the problems to analysis, three predominant dimensions or key aspects of sustainable urban development can be distinguished, i.e. social-cultural, economic-financial and environmental-spatial. Discussing the questions listed below, detailed problems are analyzed (see fig. 2). The crucial aspects of sustainable city are presented in the following part.

Socio-cultural dimension of sustainable urban development

During discourse on social-cultural dimension of sustained development, the questions presented in fig.2 belong to the most crucial ones. Stability in demographic situation is an important element, because it enables city development, not leading, however, to its overpopulation or depopulation. Next significant aspect of sustainable urban space concerns access to medical services of the highest level for all city inhabitants, provided by local authorities (Tsouros, 2009). Healthy life style popularized by city authorities together with implementing bio-political projects and bio-fitness culture are also of great importance.

Social equality supporting is another task for city policy-makers (Burton, 2000), as well as eradication

about 15 thousand scientific publications were using the term *sustainable city*

of poverty and promotion of equal gender opportunity (Johnason-Lathman, 2007). Modern urban space should be designed in a way, which reduces possibility of social conflicts occurrence (Godschalk, 2004) and thereby ensure security of all city dwellers (Kahagram et al., 2003). Another aspect is providing access to education and educational action, promoting sustainable development and environmental protection (Ahalberg et al., 2003, 2005). Care for city inhabitants' ecological awareness contributes to social support for pro-ecological investments. Thanks to education and upgrading professional skills – economic development of a region is possible, and what has been very significant in recent years – scientific and innovative sector, as well.

Economic dimension of sustainable urban development

Activity on behalf of eco-innovativeness is promoted in economic sphere of city development, because innovative ecology in production is directed at reducing or eliminate environment pollution, what can be applied in many various economy branches (Kemp, 2010). Before it is implemented in practice, its conceptual phase, i.e. scientific research is significant. Ecological innovations and technologies implemented in environmental protection are determinants and impulses for economic development and contribute to employment policy development and can, to a large extent, ensure production safety.

Sustainable city is also characterized by another crucial element, which is sustainable transport, propagating, on the one hand, using public transport (e.g. railway, tram network), on the other hand – cycling paths development (Richardson, 2005).

Sustainable city should implement reasonable waste management, as well, with the most desirable actions in this field – waste production prevention, next – waste processing for using it and recycling. In other cases – treatments of waste neutralization by burning it and eventually storing it (Biegańska, Ciula, 2011). These operations are taken up in order to diminish all possible negative effects of waste management system's elements on natural environment.

Increase of green architecture presence in urban tissue is also regarded as one of priorities in implementing sustainable development elements into city structure. From practical point of view, green architecture is strictly connected with sustainable construction, determined by defined regulations, like: e.g. effective use of renewable energy sources and energy efficiency, using environmental friendly and reusable materials, prevention of air, water and soil pollution, integration with natural and social environment and sustainable land use (Iwanek, 2009; Kamionka, 2010). Sustainable construction can therefore, solve a number of environmental problems by introducing innovative technologies, improving energy efficiency and increasing in whole energy pro-

duction participation of renewable energy sources (Chodowska-Miszczuk, Szymańska, 2014).

Urban farming development is also one of recommended sectors of sustainable city activities (Smit et al., 1996; Mougeot, 2006), which provides fresh and healthy food for local inhabitants.

Environmental-spatial dimension of sustainable urban development

All aspects of sustainable development should be depicted in practice, what means – in spatial planning, which consists of the stages, following one another: background of spatial policy, elaborating local plans or strategy of land use planning, the plan implementation, and finally – monitoring of actions resulting from the plan functioning. The idea of sustainable development employed in spatial planning process guarantee among others: providing care for environment quality, proper resources management, including first of all rational land use, taking up pro-ecological solutions in technical-technological area and care for proper public area organization, with particular stress on significant participation of biologically active area (Rogatka, Lewandowska, 2014). Green areas in cities are extremely important, therefore activities promoting green infrastructure, which Benedict and McMahon (2006) define as *a strategically planned and managed network of wilderness, parks, greenways, conservation easements, and working lands with conservation value that supports native species, maintains natural ecological processes, sustains air and water resources, and contributes to the health and quality of life for (...) communities and people' should be taken up. Green area functions as, among others, catalyst of climatic conditions, neutralizing occurrence of the so called 'urban heat islands'*.

Nature protection in cities concentrates on activities directed at preserving a kind of optimum state for fauna and flora and their habitat in urban ecosystem, caring for ecosystem proper functioning in direct urban population contact with natural environment (Muller, 1998). Protective treatments should also turn attention to keeping biodiversity, including air, water and soil (Lewandowska, 2014b).

Noise pollution neutralizing is another significant task of urban areas authorities, due to its danger for living organisms' health, what in consequence affects work efficiency. Recommended situation is the state, when people can decide by themselves on character of their acoustic surrounding and are not forced to stay and live in unbearable noise (Goines, Hagler, 2007).

All the actions listed above will never be implemented, if local communities and self-government authorities are not taught a lesson on ecological education, which tasks are: 1) *building ecological thinking*, 2) *popularizing reliable knowledge on environment condition and dangers of pollution*, 3) *mobilizing for initiating recovery measures and searching*

for remedies against next dangers, 4) teaching environmentally friendly attitude (Tyburski, 2013, p. 314).

Summary

It must be stressed that contemporary concepts of urban development relate in many aspects to the idea of sustainable development. As it was pointed out, there are many city concepts, which definitions interlace. Therefore, it can only be postulated to unify terminology and limit definition range of ideas outlined in the text, with the most recommended term *sustainable city*, while the other names reconnect only to some of the aspects of the idea of sustainable development. In case of green city, it will be harmonization of relations between human-nature, in case of eco-city, the stress will be put on pro-ecological technologies implementation within city space, taking smart-city into account – the attention will be concentrated on the necessity of modern electronic-information technologies application, while in compact city – sustainable transport and changes in land use policy will be promoted. The vast majority of researchers are of an opinion, that regardless this or that city concept, all of them should care for not only the benefits of present, but first and foremost future generations and environment for future existence and this is the principle of city present designing.

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